CITYSPIN

Cyber-Physical Social Systems for City-wide Infrastructures

Deliverable 8.1: Dissemination Plan

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Executive Summary

This deliverable sums up the dissemination results of the first project year, it proposes a project-wide dissemination plan and identifies concrete dissemination actions for the next project year.

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1 Introduction

Dissemination is an important part of CitySPIN. It is coordinated as part of WP8 and makes sure that results of all WPs are disseminated to the suitable stakeholders.

This deliverable provides a structured, project-wide dissemination plan (Section 2). Additionally, it sums up dissemination actions performed in the first year of the project (Section 3) focusing on diverse stakeholders ranging from research communities, to related projects and company internal dissemination. Finally, we also identify concrete dissemination actions for the next year in the project (Section 4).

2 Dissemination Planning

Dissemination planning consists in identifying the key stakeholder groups to target (Section 2.1) as well as to identify which project outcomes will be disseminated to which stakeholder group (Section 2.2).

2.1 Key Target Stakeholder Groups

The following key target stakeholder groups of relevant for CitySPIN:

- **Subsidiaries of the WStW holding**, such as Wien Energie or Wiener Linien, will benefit first-line from new knowledge and technologies for extending their CPS systems towards CPSS. Unique Selling Points (USP) of CitySPIN are: a completely novel CPSS Blueprint (comprising the CPSS taxonomy, architecture patterns, SAM); a Linked Data based, privacy-aware, scalable data acquisition and integration infrastructure geared to support CPSS scenarios; and use case demonstrators to showcase the concrete use of these results.
- Other companies such as **infrastructure/CPSS providers**, and more generically, companies with data integration needs. Although geared to WStW, the result achieved by the project will be relevant for any medium and large organization that needs to integrate large amounts of data, as most of the research is on a fundamental level. These companies represent a considerable segment of the Big Data Market, a worldwide multibillion-dollar market growing at a compound annual rate of 23.1% over the 2014-2019 period (Nadkarni, 2015; Nadkarni, 2015a).
- **Research Communities** that will most benefit from CitySPIN are those in the area of CPS, Collective Intelligence (CI), Software Engineering (SE), Semantic Web and Linked Data, Process Mining. Outcomes will also be interesting to researchers working in the Smart City application area. Through research on the CPSS Blueprint, new knowledge will be gained about CPSS systems (i.e., types of systems, benefits, engineering principles), a new breed of systems relevant both for CPS and CI researchers. SE will be enriched with architectural patterns of city-wide software systems. Technical realization of CPSS through Linked Data technologies will be interesting to all disciplines.
- **Citizens and City representatives (Stadt Wien)**. CitySPIN results will ultimately benefit citizens and contribute to improving quality of life in terms of having access

to more efficient, comfortable and sustainable city-wide infrastructures. The introduction of CPSS technology in Vienna will constitute a substantial step towards achieving Vienna's Smart City vision. The developed methodologies for engineering city-wide systems will benefit other municipalities in adopting cutting edge linked data research to enable CPSS.

2.2 Dissemination Plan

The dissemination plan includes:

- (1) publications in WSTW internal newsletter and communication networks;
- (2) attending tool fairs and organizing industry focused events such as Meetups to disseminate project results to potentially interested commercial stakeholders;
- (3) scientific dissemination in terms of conference and journal papers, as well as organized workshops and special issues;
- (4) a web-site, news releases and social media presence for distributing publicly available project information and results to a wider audience.

Stakeholder> **Result**	**WStW subsidiaries**	**CPPS Providers**	**Companies with data integration needs**	**Research Communities**	**Citizens/ City representatives (e.g, Stadt Wien)**
CPSS Blueprint	internal newsletter and communication channels (WStW)	present at tool fairs and specialised events (SWC)		conference/ journal papers in Semantic Web, software engineering, process mining (TU, WU). Organization of workshops and special issue (TU, WU). PhD, master, diploma theses (TU, WU)	
Process Mining and Monitoring algorithm			organize (SemWeb)Meetups (SWC)		
Data integration technology stack					
Visual data integration platform (PoC)					web-site, social media, news media.
CPSS use demonstrators					

3 Project Wide Dissemination in the first Project Year

3.1 Project Logo and Website

A project Logo was prepared in the first month of the project and used for the design of the web-site as well as other project materials, such as presentation slides and deliverable templates.

The project Website (http://cityspin.net/) was launched in M1, in line with the workplan. It contains overall information about the project and serves as a first line of dissemination for project results (deliverables, papers) and news, which are updated continuously.

3.2 Scientific Dissemination - Publications

In the first year, a number of 13 papers were published by the academic partners involved in the project (TU/WU) based on work performed in CitySPIN, including 5 journal papers, 5 conference papers and 3 poster/workshop papers, as shown in the following table.

Paper Nr.	Reference	Type	Pub. Year	Partner
13	Javier D. Fernández, Sabrina Kirrane, Axel Polleres and Simon Steyskal. **HDTcrypt: Compression and Encryption of RDF Datasets**. In *Semantic Web Journal*, in press.	J.	2018	WU
12	Axel Polleres, Maulik R. Kamdar, Javier D. Fernández, Tania Tudorache, Mark A. Musen: **A More Decentralized Vision for Linked Data**. Proc. of the 2nd Workshop on Decentralizing the Semantic Web co-located with the 17th International Semantic Web Conference, DeSemWeb@ISWC, CEUR-2165, paper 1, 2018.	Worksho p	2018	WU
11	Patrick Westphal, Javier Fernández, Sabrina Kirrane and Jens Lehmann. SPIRIT: A Semantic Transparency and Compliance Stack. Proc. of the Posters and Demos Track of the 14th International Conference on Semantic Systems (SEMANTiCS 2018), CEUR-2198, paper 119, 2018.	Post er	2018	WU
10	Claudio Di Ciccio, Alessio Cecconi, Jan Mendling, Dominik Felix, Dominik Haas, Daniel Lilek, Florian Riel, Andreas Rumpl, Philipp Uhlig: **Blockchain-Based Traceability of Inter-organisational Business Processes**. Business	Conf	2018	WU

	Modeling and Software Design – 8th International Symposium, 2018.			
9	Marta Sabou, Dietmar Winkler, Peter Penzerstadler, Stefan Biffl: **Verifying Conceptual Domain Models with Human Computation: A Case Study in Software Engineering**. Sixth AAAI Conference on Human Computation and Crowdsourcing, 2018	Conf	2018	TU
8	Marta Sabou, Angelika Musil, Juergen Musil, Stefan Biffl: **Collective Intelligence Aspects of Cyber-Physical Social Systems: Results of a Systematic Mapping Study**. Proc. of Collective Intelligence, 2018.	Conf	2018	TU
7	Marta Sabou, Lora Aroyo, Kalina Bontcheva, Alessandro Bozzon, Rehab K. Qarout: **Semantic Web and Human Computation: the Status of an Emerging Field**. Semantic Web Journal 9(3):1-12, 2018.	J.	2018	TU
6	Javier D. Fernández, Jürgen Umbrich, Axel Polleres, and Magnus Knuth. **Evaluating Query and Storage Strategies for RDF Archives**. In *Semantic Web Journal*, in press.	J.	2018	WU
5	Javier D. Fernández, Miguel A. Martínez-Prieto, Axel Polleres and Julian Reindorf. **HDTQ: Managing RDF Datasets in Compressed Space**. In *Proc. of ESWC 2018*.	Conf	2018	WU
4	Maggi, F.M., Di Ciccio, C., Di Francescomarino, C., Kala T. 2018. **Parallel Algorithms for the Automated Discovery of Declarative Process Models**. *Information Systems* 74, Part 2 (2018), 136–152.	J.	2018	WU
3	Cecconi, A., Di Ciccio, C., De Giacomo, G., Mendling, J. **Interestingness of Traces in Declarative Process Mining: The Janus $LTLp_f$ Approach.** *Business Process Management* (2018), 121-138.	Conf	2018	WU
2	Ekaputra, F.J., Sabou, M., Serral, E., Kiesling, E. and Biffl, S. 2017. **Ontology-Based Data Integration in Multi-Disciplinary Engineering Environments: A Review**. *Open Journal of Information Systems (OJIS)*. 4, 1 (2017), 1–26	J.	2017	TU
1	A. Ahmeti, S. Bala, F. J. Ekaputra, J. D. Fernández, E. Kiesling, A. Koller, J. Mendling, A. Musil, A. Polleres, P. R. Aryan, M. Sabou, A. Solti, and J. Musil, **CitySPIN: Cyber-Physical Social Systems for City-wide Infrastructures.** in *Proceedings of the Posters and Demos Track of the 13th*	Poster	2017	WU

	International Conference on Semantic Systems – SEMANTiCS2017, 2017.			

3.3 Scientific Dissemination - Teaching

CitySPIN related research was also disseminated among students as part of various teaching activities.

At TU Wien:

- 6 students took a seminar related to Wissenschaftliches Arbeit focusing on the collaborative execution of a literature study in the area of CPSS.
- Two Bachelor thesis are currently being conducted.
- The PhD thesis of Mr. Fajar Ekaputra was submitted for review and will be defended in November 2018. The last year of his PhD work was supported by CitySPIN and will provide a basis for knowledge change management issues in CPSS as part of WP4 (task T4.4).
- Started a teaching collaboration on process mining: Dr. Di Ciccio will give a special guest lecture in the course on "Enterprise Modeling", taught at TU Wien in the winter term 2018.

At WU Wien:

- Two students are working on a practical application related to the CitySPIN use cases for the course "Data Science Lab" of our SBWL Data Science for Bachelor students.
- One Bachelor thesis on log analysis for GDPR transparency and compliance (related to WP6) is being conducted.
- One Bachelor thesis is currently focused on open data integration and visualization, which can be used as input for our CitySPIN use cases.

3.4 Scientific Dissemination - Collaboration with other Researchers and Projects

The CitySPIN consortium also engaged in intense dissemination by collaborating with researchers external to the project as well as national and international projects.

TU Wien performed the following dissemination of this kind:

- In collaboration with the SoBigData[1] project, a research visit of two weeks was performed by M. Sabou at CNR Pisa on the topic of mobility analytics and how this can support CPSS. Data and experiment design created during the meeting was shared with the research community on the SoBigData dedicated data science portal. A blog post[2] was also written and a follow-up publication is being prepared.

[1] http://www.sobigdata.eu/index

[2] http://www.sobigdata.eu/blog/semantics-enabled-transfer-learning-mobility-analytics-sobigdata-tna-experience

- As part of WP2 work, our study raised the interest of Prof. Danny Weyns[3], an internationally renowned expert in the software engineering of self-adaptive systems. In order to publish this study in a very high-ranking software engineering journal, he suggested re-running the study and broadening its scope. We followed his recommendation and involved other four experts (including Prof. Wayns) to run the study. None of these experts are paid from CitySPIN funds.

SWC is also involved in several national and international research projects among which it disseminated CitySPIN related information, as follows:

- Connect to and inform other FFG and H2020 projects about CitySPIN to broaden the relevance of the techniques developed during the project - with a strong focus on destiling overlapping solutions and corresponding aims.
- Embed the activities re. the gathering of open and closed data into the overall discussion which happened at the DMA Project. E.g. on Open Data, Data Harvesting, GDPR and similar.

WU Vienna:

- In the context of the EU H2020 project RISE_BPM[4], C. Di Ciccio and A. Cecconi have undertaken a research visit of one month at the University of Melbourne. RISE_BPM is a MSCA project aimed at propelling Business Process Management research through staff exchange. During their stay in Melbourne they have set out plans for research collaboration with members of the hosting team of the School of Computing and Information Systems[5], and members of the Department of Infrastructure Engineering. The planned research endeavours would be centred on the utilisation of declarative process constraints as an information extraction and modelling means for workflows, suitable to manage the flexibility and inner complexity of CPSSs.
- As planned, we are working in close collaboration with the SPECIAL[6] EU H2020 project. In the context of WP6, we first analyzed and extended the SPECIAL policy language to fit CPSS scenarios and, in particular, our CitySPIN use cases. Thus, this extension would be reflected in future versions of the SPECIAL policy language. In turn, we plan to continue the adaptation of the SPECIAL policy log vocabulary in order to provide further GDPR-based transparency and compliance.
- We presented the CitySPIN project in the Dagstuhl-Seminar on Big Stream Processing Systems[7] where we established connections with important potential partners in the area. We are currently inspecting the use of existing Big Data frameworks, such as Flink, to support large-scale Linked Data scenarios (related to WP4).

[3] Homepage Danny Weyns: https://people.cs.kuleuven.be/~danny.weyns/

[4] http://www.rise-bpm.eu/

[5] https://cis.unimelb.edu.au/

[6] https://www.specialprivacy.eu/

[7] https://www.dagstuhl.de/de/programm/kalender/semhp/?semnr=17441

3.5 Company Specific Dissemination

SWC introduced the concept of CPSS into the knowledge stack of SWC internally, by organizing trainings and workshops explaining and reflecting of CPSS concept.

WSTW disseminated CitySPIN related information internally to the company as follows:

- As part of the series “Hands on IT” Elmar Kiesling performed a knowledge transfer exercise and talked about Linked Data, Data Science Methods and Knowledge Graphs in front of an audience, consisting of several stakeholders which came from a variety of WSTW-subsidiaries.
- WSTW also has an innovation department which hosts an quarterly event called “Innovation Base Meeting”. It’s purpose is to bring together all innovation managers of WSTW’s subsidiaries and report ongoing projects, give insights to new and upcoming topics and present current innovation trends. CitySPIN was part of the Agenda in the last Innovation Base Meeting in September 2018 where we gave an insight to the current activities. CitySPIN-News and Reports will be presented on a regular basis in this recurring meeting.

WSTW identified several topics and internal projects where the dissemination of CitySPIN results should be performed. These include:

- First, there is the data privacy aspect which will be part of the studies and contribute to the GDPR mechanisms currently deployed within the company. There are currently several projects ongoing (Customer 360°, Multi-Channel/Multi-Utility Products etc.) which have many touchpoints with this topic.
- Second, the findings in the studies of Semantic Web technologies and knowledge graphs can have a big benefit in the asset management and asset knowledge in the upcoming IoT-Project which is a WSTW-wide project and will incorporate all our subsidiaries and their future IoT-Assets. This should make our IoT-Infrastructure more manageable and less complex. We had first thoughts and talks on this topic with Elmar Kiesling.
- Third, findings in the field of Linked Data and the IT-infrastructure therefore needed will also deliver applicable knowledge in the Data-Driven Architecture (based on Lambda-Architecture Model) which is also currently being established at our IT-Service Provider Wien IT. This Architecture should deliver Lab- and Factory-Methods for our subsidiaries to support them in their data-science activities.

4 Dissemination Plan per Project Partner

This section collects dissemination activities planned by each project partner during the next project year.

4.1 TU Wien

TU's dissemination plan includes the following papers to address several of the communities of interest to CitySPIN.

Paper Topic	**Venue**	**Research Community**
CPSS Study (WP2)	Information and Software Technology (Journal)	Software Engineering
CPSS Architecture pattern	EUROPLOP'19	Software Engineering
Semantics for mobility analytics	GEOProcessing 2019	Smart City
Semantics for transfer learning: a use case in mobility analytics	Extended Semantic Web Conference	Semantic Web
Data Integration in city-wide infrastructures (Wiener Linien, Wien Energie use cases, LWP + UV, Vocabularies..?)	ISWC (**in-use**, industry, research?)	Semantic Web
Survey of Vocabularies for CPSS/city-wide infrastructures	Workshop or journal	Smart City, Semantic Web?
LD-centric CPSS architecture	Semantics 2019?	Enterprise Information Systems
Declarative Process Ontology	Extended Semantic Web Conference	Semantic Web
Process mining on Linked Data	TBD	TBD - Process mining?
Conformance checking using SHACL	TBD	TBD - Process mining?

Additionally, we will further pursue dissemination through teaching as well as through collaboration with projects or researchers external to the project.

4.2 WU

Our dissemination plan at WU includes the following papers:

Paper Topic	Venue	Research Community
Declarative Process Ontology	Extended Semantic Web Conference	Semantic Web
Discovery of Data-Aware Declarative Processes	ACM Trans. on Database Systems, Journal	Databases
Policy Formalization	International Conference on Cyber-Physical Systems	Cyber Physical Systems
RDF store scalability	Web Conference	Semantic Web
Context in RDF stores	Extended Semantic Web Conference	Semantic Web
Policy and log formalization for transparency and compliance	Privacy and Security (TOPS), Journal	Privacy and Security

4.3 SWC

SWC will continue its activities of internal dissemination as well as liaising with relevant national and international research projects.

Additionally, for the coming period, we plan to showcase the PoC's developed during CitySPIN. For that we are planning to have a descriptive part for each PoC on the Website and publish them in form of two-sided print leaflets.

4.4 WSTW

Dissemination activities will include WSTW-internal events and will be spread through diverse media-channels, such as 'Corporate TV' or 'Intranet Posts'. There is also an internal Company News-Platform/Newsletter where we plan to publish a feature about the CitySPIN project. This will give an insight about the collaboration with universities to our subsidiaries and promote the ongoing digitization initiatives which are part of the company wide IT-Strategy. It should also animate coworkers to spread their ideas in the existing company networks which have the purpose to drive innovation and new business models.

CitySPIN-News and Reports will be presented on a regular basis in the quarterly event "Innovation Base Meeting".

5 References

Nadkarni, A., Goepfert, J., & Shirer, M. (2015). New IDC Forecast Sees Worldwide Big Data Technology and Services Market Growing to $48.6 Billion in 2019. Retrieved March 3, 2017, from http://www.idc.com/getdoc.jsp?containerId=prUS40560115

Nadkarni, A., & Vesset, D. (2015). *Worldwide Big Data Technology and Services Forecast, 2015-2019*. *IDC Market Forecast*. Retrieved from https://www.idc.com/getdoc.jsp?containerId=259532